

Report Authors

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Purpose

Site specific field evaluation of proposed stands for commercial timber harvest, and the soil mapping units occurring at the stand level.

Procedure

NRCS and USFS soil scientists participating in this supplemental field review agree, based on previous experience that F slopes are threshold slopes at which issues with instability, erosion, and soil productivity may begin to occur without proper mitigation. Thus, the CNF developed a stand-by-stand tally of percent F and G slopes (as mapped by NRCS) and stand-specific maps (displaying both soil map unit and percent F and G slopes) for the purpose of selecting highest priority units for inspection (Attachments A, B, and C). Due to time, weather, and access constraints during the initial fieldwork, the areas visited were prioritized based on occurrence of F and G slopes. Over the course of 2 days in November 2014, the participants visited 14 out of 30 stands proposed for commercial treatment. Over the course of 3 days in February 2015, field inspections of the remaining stands were made by subsets of the project team. Stand 214/15 is not included in this tally as it was dropped from consideration as a commercial harvest unit in all alternatives in response to comments on the EA dated January 30, 2014 related to steep, rocky soils that would not be operable with ground-based machinery.

Slope ranges used in the Greene County, Tennessee NRCS soil survey are as follows:

C: 5-12%
D: 12-20%
E: 20-35%
F: 35-50%
G: 50-80%

General Results and Observations

In general, field analysis of the proposed stands showed that a number of the areas proposed for commercial timber harvest within the stands have less steep slopes than the stands as a whole, and lesser slopes than the larger soil map units within which they are located. A second point of note is that there are areas with steep slopes that would be excluded from the harvesting activities because they are located within the riparian area, based on Forest Plan standards. Several of the areas showed evidence of old skid roads from past timber operations that have re-vegetated and remained stable over time;

therefore, with planned mitigations and BMPs, it is not anticipated that the results from the proposed entry would create issues with erosion and or/instability. Harvesting could be implemented in these stands with steep slopes in compliance with the Cherokee National Forest Land and Resource Management Plan Standards and Guidelines. In stands where the forest plan standards and guidelines would not be sufficient, additional recommended design criteria and/or mitigation measures would limit the effects from the harvesting activities.

Additional Design Criteria

Cherokee National Forest standard operating procedures in addition to those presented in the Design Criteria Section of the EA include the following:

- Skid trails and temporary roads for the purpose of timber harvest would not be constructed for sustained distances over 200 feet in areas with slopes of 40% or greater ("steep area"). The 200-foot length can be exceeded however where the skid trail and/or temporary road is needed to traverse a steep area in order to access the remaining harvest unit(s). *Such an exceedance requires approval from a forest interdisciplinary team composed of an appropriate group of specialists.* Trees within the traversed steep area would not be harvested, except where possible through cable winching to equipment placed outside the steep area.
- To achieve restocking levels required by FS regulations, survival checks are performed on regeneration units at the following intervals:
 - Natural regeneration sites are checked in the 1st, 3rd and 5th year post-harvest with the objective of certifying stocking levels in year 5.
 - Planted sites are checked 1st and 3rd year post-harvest. Stocking level is certified in year 3.
- During survival checks, the timber staff also evaluates the effectiveness of BMP implementation on skid roads, landings, and temporary haul roads. If deficiencies are found, they are addressed with appropriate corrective measures which may include the following: seed, straw, fertilizer, mulch, matting, slash, tops, and others.
- Different seed mixes are used depending on soil type, steepness, time of year, and other factors. Generally, annual grains are used.
- Unacceptable ruts created on skid roads or log landings during harvesting operations are smoothed out, water is diverted appropriately, and erosion is thusly limited.
- If rutting occurs within the unit (off of skid trails), operations are halted by the sale administrator until soil moisture conditions improve.
- Ground cover shall be applied to all bladed areas with greater than 10% slope on the following soil map units as part of erosion control: Brasstown, Cataska, Junaluska, and Northcove. Ground cover, may include mulch, logging slash, natural leaf-fall, etc. These areas will also have drainage controls installed before closure.

Site-Specific Observations and Design Criteria

Below are the field notes and site-specific mitigation measures for each stand visited.

Date: 11/12/14

Participants: Jim Stelick (Silviculturist), Ali Reddington (Hydrologist), Jason Jennings (Soil Scientist), Jeff Kincaid (Silviculture Prescriptionist), Anthony Khiel (NRCS Soil Scientist), and Nathan Hartgrove (NRCS Soil Scientist)

The first day of fieldwork focused on the Meadow Ridge, Bellcow Mountain, and Courtland Place Areas.

Compartment 217 Stand 10

Observations

Most of the area mapped as Junaluska-Brasstown "F" slopes is actually dominated by "E" slopes with intermittent spots that may exceed 35%.

Design Criteria

One steep area on the NE corner of the stand may be harvested by cabling trees up slope. There would be no roads placed in this steep section. Much of the area mapped as Northcove "F" slopes would be excluded from harvesting activities because it is in the riparian area.

Figure 1. Looking north along ridge mapped as Junaluska-Brasstown "F" in 217/10



Compartment 217 Stand 31

Observations

Much of the eastern portion of this stand is mapped as Junaluska-Brasstown "F" slopes. During the field review we found that the area has both "E" and "F" slopes. During the field review we found old roads in this stand that are vegetated and have remained stable for many years with no evidence of slipping or slumping. Tree form in the unit also indicates that the soil is generally stable both upslope and downslope from the old road. Based on this field investigation the stand was determined appropriate for proposed harvest operations.

Design Criteria

Certain areas below the old road were identified as too steep (G-slopes) and no ground-based harvesting will occur in those areas.

Figure 2. Old road through 217/31. Area mapped as Junaluska-Brasstown "F".



Figure 3. Ridge mapped as Junaluska-Brasstown "E" in 217/31. The dominant grade on the area of this ridge proposed for management is less than 20%.



Compartment 217 Stand 36

Observations

The majority of the area mapped as Junaluska-Brasstown "F" were measured as F slope gradient during the field visit. An exception is gradient along the crest of the ridge which was measured at 20-35%, or E slopes. The portions that are "F" slopes are in the lower portion of the "F" slope range. There would be a skid road that would traverse the slope on contour into some portions of the "F" slope range.

Design Criteria

This proposed skid road should have a minimal bench cut (not exceeding 4 ft deep) and erosion control would be implemented. Erosion control methods would include waterbars and/or rolling dips, ripping, chisel plow and/or disking, seeding, and mulching. Coconut coir matting would be used as needed. Everyone in the field agreed that this road would be manageable with these measures if applied. The mid-slope skid road is not anticipated to remain open for more than two weeks, after which time it would be water-barred, seeded, and ground cover applied where necessary. It should, however, be noted that unplanned events (weather, etc.) could cause it to remain open longer.

Compartment 215 Stand 46

Observations

Although mapped as a G slope (50-80%), this stand also has soil mapping unit components identified in C, D, E and F slope groups. The majority of the stand in the northwest quadrant has both E and F slope, with most being E slope gradient, or 20-35%.

Design Criteria

Steeper sections in this portion of the stand would be accessed from the ridge tops and cables would be used to cable trees up slope.

Figure 4. Looking northwest into 215/46 along ridgeline mapped as Brasstown "G", however the ridge crest and upper slopes are lower gradient than Brasstown G as mapped.



Compartment 216 Stand 29

Observations

Although this unit falls within soil map units labeled as F slopes,- the slopes in areas proposed for management mainly ranged from 15-35% slopes ("D" and "E" slopes).

Design Criteria

This stand has a steeper portion (G slopes) which is located adjacent to the Forest Service road and no equipment will be permitted on that portion of the unit. No additional design criteria needed in this stand.

Compartment 216 Stand 2

Observations

We analyzed the eastern portion of this stand which is the steepest portion of the stand. We found that the lower portion of the stand on the east side has 38% slopes. However, 50 feet above that slope measurement the slope changed to 20% and on top of the ridge the slope measured 10%. The majority of this stand would be considered as having "D" and "E" slopes.

Design Criteria

The steeper sections would be accessed from above and a cable would be used to move the harvested trees upslope to flatter areas. No additional design criteria needed in this stand due to the prevalence of lesser slopes.

Figure 5. Looking upgradient along northernmost ridge in 216/2. Area mapped as Junaluska-Brasstown "F".



Figure 6. In 216/2, no ground-based equipment operation will occur on steep side-slope descending away from ridge towards road. Further than 65'-75' from ridge crest the ground is too steep for ground based equipment. Some limited cabling may occur. Area mapped as Junaluska-Brasstown "F".



Figure 7. Existing Dozer Line in 216/2. Area mapped as Junaluska-Brasstown "D".



Date: 11/13/14

Participants: Jim Stelick (Silviculturist), Ali Reddington (Hydrologist), Jason Jennings (Soil Scientist)

The second day of fieldwork focused on stands in the Devil's Kitchen area. There are several old roads in this area. Old roads are generally stable, except where unauthorized use is occurring. Roads that are receiving frequent unauthorized use are being eroded and/or compacted, and need to be reshaped and/or decommissioned. Implementation of the proposed project would aid in stabilizing these road issues. Road condition photos are presented in figures 8 and 9, below.

Figure 8. FSR 93. Area mapped as Northcove "E".



Figure 9. FSR 93. Area mapped as Northcove "E".



Compartment 209 Stand 1

Observations

Mapped as "E" slopes, field visit validated this mapping.

Design Criteria

Standard.

Figure 10. Looking east into area of 209/1 mapped as Junaluska-Brasstown "E".



Compartment 209 Stand 4

Observations

Mapped as "F" slopes. Some steeper areas are present. Field visit validated mapping.

Design Criteria

Ground based equipment will be restricted to appropriate areas as specified in the design criteria in the EA and this document.

Figure 11. View of 209/4 in background. Looking southwest along FSR 93. Area mapped as Junaluska-Brasstown "F" slope.



Compartment 209 Stand 3

Observations

Mapped as “F” slopes. Field visit found that most of the area proposed for management actually has “D” and “E” slopes with intermittent “F” slopes toward the upper side of the ridge.

Design Criteria Standard.

Figure 12. View northwest into 209/3 from FSR 93. Area mapped as Junaluska-Brasstown “F”.



Compartment 209 Stand 7

Observations

Mapped accurately as “F” slopes. Some steeper areas are present.

Design Criteria

Ground based equipment will be restricted to appropriate areas as specified in the design criteria in the EA and this document.

Compartment 209 Stand 21

Observations

Mapped as "F" slopes. Field visit found that most of the area proposed for management actually has "D" and "E" slopes with intermittent "F" slopes.

Design Criteria Standard.

Figure 13. View east into 209/21 from northwestern corner of unit. Area mapped as Junaluska-Brasstown "F".



Compartment 209 Stand 19

Observations

Mapped as "E" slopes. Field visit found that most of the area proposed for management actually has "C" and "D" slopes.

Design Criteria Standard.

Compartment 209 Stand 39

Observations

Mapped as having "G" and "E" slopes. Field visit found that most of the area proposed for management actually has "C" and "D" slopes.

Design Criteria
Standard.

Compartment 209 Stand 30

Observations

There are areas in this stand that are mapped as having "G" slopes. Portions of these areas are within the upper range of "F" slopes. There are slopes exceeding 50% in this stand and a few isolated areas that appear to have unstable soil conditions in the steep sections.

Design Criteria

Special precautions should be used to avoid these areas with heavy equipment and bench-cut roads during implementation. A forest hydrologist and/or soil scientist should review layout, implementation, and rehab of this stand. These concerns are only for the steep sections and unstable areas of the stand. No constraints would be needed for the portions of the stand that have "E" slopes.

Figure 14. View south into 209/30 from FSR 93. Area mapped as Unicoi Rock Outcrop. Some signs of localized soil instability present in this area.



Date: 2/2/15

Participants: Jim Stelick (Silviculturist), Ali Reddington (Hydrologist), Jeff Kincaid (Prescription Forester)

The third day of fieldwork focused on visiting the remaining stands in the Meadow Ridge, Bellcow Mountain, and Courtland Place Areas. The day's fieldwork also included a visit to a timber sale closed in 2009 and located adjacent to Compartment 217 Stand 4. Both the 2009 sale and 217/4 are located primarily on Junaluska-Brasstown Complex soils with areas of Northcove. Skid roads and log landings associated with this sale are stable and fully revegetated. Equipment was limited to locations with appropriate slopes and bladed skid roads were minimized in compliance with forest plan standards and Tennessee BMPs.

Figure 15. Skid Road used in 2009 Sale. Area mapped as Junaluska-Brasstown "F" (35-50% slopes). Waterbars are functioning and road is fully revegetated.



Figure 16. Ridge above system road was logged without construction of a mid-slope skid road in 2009. Proposed sale would be executed with a similar layout. Area mapped as Junaluska-Brasstown "F".



Figure 17. Landing used for 2009 sale is stable and fully revegetated. Area mapped as Junaluska-Brasstown "D".



Compartment 216 Stand 25

Observations

The small areas in the southern portion of the stand mapped as Northcove F and Cataska G actually have “E” slopes and are similar topographically to the area mapped as Junaluska-Brasstown Complex F. The dominant grade in southeastern portion of the stand is approximately 35%. The vast majority of the stand is dominated by slopes less than 5%. The Courtland Place Administrative Site is completely within the riparian corridor, but the log landing will be outside of the riparian corridor.

Design Criteria

Only the area east of the stream is proposed for commercial timber harvest. The area west of the stream running through the unit is proposed for non-commercial silvicultural treatments only. No ground disturbance will result from these non-commercial activities. Please note that the east fork of the stream within the unit is actually located slightly to the west of where it is shown on the topo map, meaning that the areas mapped as Northcove F and Cataska G are within the area proposed for commercial treatment (see above for discussion on actual conditions in these areas). No skid roads will be built in these areas because of issues with undercutting the Hurricane Gap Road and visual concerns associated with the Appalachian Trail. If a skid road is necessary to get to the timber in this area of the stand, this portion of the stand will be dropped from the sale. Otherwise, timber will be removed via a cable winch.

Figure 18. Looking southeast into 216/25 from Courtland Place. Area mapped as Brasstown “C”.



Compartment 215 Stands 22 and 53

Observations

These stands are very flat. The majority of the stands have slopes less than 5%. The small area mapped as Junaluska-Brasstown F will be excluded because it is within the riparian buffer.

Design Criteria

Standard.

Figure 19. Looking north into 215/22 and 215/53 from edge of wildlife field across from Courtland Place. Area mapped as Brasstown "C".



Compartment 215 Stand 47

Observations

This stand is accurately mapped as being dominated by “F” slopes. On site measurements indicate that the average grade is approximately 45% - 50%. Pistol butted trees indicate the occurrence of soil creep both above and below the road.

Design Criteria

Drainage features on skid roads could cause erosion issues on these steep slopes. Non-commercial treatment may be a more appropriate option for this stand.

Figure 20. Western corner of 215/47. Area mapped as Junaluska-Brasstown “F”.



Figure 21. Western side of main ridge in 215/47. Area mapped as Junaluska-Brasstown "F".



Figure 22. Western side of main ridge in 215/47 (wider view). Area mapped as Junaluska-Brasstown "F".

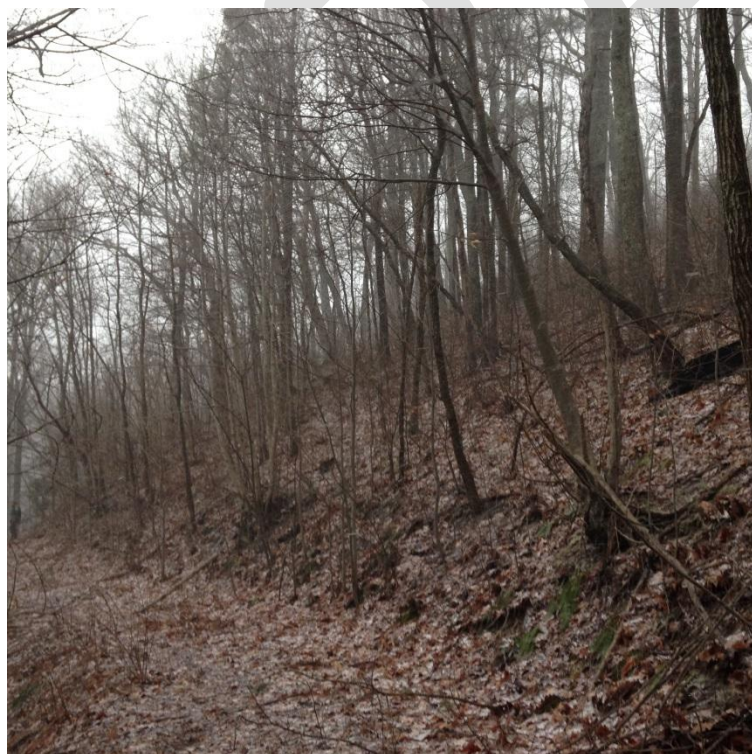


Figure 23. Cut slope of road forming lower boundary of 215/47. Area mapped as Junaluska-Brasstown "F".



Figure 24. Cut slope of road forming lower boundary of 215/47 (wider view). Area mapped as Junaluska-Brasstown "F".



Figure 25. Pistol butted trees indicate soil creep. Area mapped as Junaluska-Brasstown "F".



Compartment 217 Stand 4

Observations

This stand is characterized by highly dissected topography with numerous ephemeral streams. The area north of the road is variable in slope from D to F. The area below the road is more variable with ridge slopes around 35% side-slopes down to ephemeral drainages up to 55%. The area to the northwest of the old tower site (mapped as Junaluska-Brasstown E and F) has an average grade of approximately 15% - 20% (i.e. "D" slopes).

Design Criteria

Above the road, no mid-slope skid road will be constructed. All timber will be brought up to a skid road at the top of the ridge or down to the existing road. The 2009 timber sale adjacent to this proposed unit was implemented this way without issue. See photos 15-17.

Below the road, ground based equipment shall be excluded from slopes in excess of 45% in accordance with project design criteria. Logs may be cabled up to ridges or to the road. No timber harvest will occur on areas mapped as Northcove F.

Due to the complex topography in this stand, a forest hydrologist and/or soil scientist should review layout, implementation, and rehab of this stand.

Figure 26. Looking downslope from road across 35% ridge just west of larger of the two areas mapped as Northcove F. Ridge mapped as Junaluska-Brasstown Complex F. Equipment will operate on the ridge as far as the slope break into the drainage (where slopes exceed 55%). Beyond that, timber may be cabled up to the ridge or the road.



Figure 27. Pistol butted tress below the road may indicate some soil creep. Area mapped as Junaluska-Brasstown "F".



Figure 28. One of the ridges below the road proposed for commercial timber harvest. Area mapped as Junaluska-Brasstown "F".



Figure 29. Looking north into northeastern portion of stand. Area mapped as Junaluska-Brasstown "D".



Date: 2/3/15

Participants: Ali Reddington (Hydrologist)

One stand, 218/10, was inspected on the fourth day of fieldwork. It should be noted that FSR 422 is in extremely poor condition between stands 217/31 and 218/10. This road segment is steep, entrenched, has inadequate drainage, and is a source of gully erosion. This portion of road is slated for decommissioning under Alternatives B, C, and D.

Figure 30. Looking south along portion of FSR 422 slated for decommissioning. Area mapped as Junaluska-Brasstown "F".



Figure 31. Looking north at southern terminus of segment of FSR 422 slated for decommissioning. The FS has felled trees in this vicinity to discourage illegal OHV use. Area mapped as Junaluska-Brasstown "E".



Compartment 218 Stand 10

Observations

This stand is mapped primarily as Junaluska-Brasstown E (20-35%). Field investigation identified that the majority of the stand is dominated by “D” slopes (12-20%). Old skid roads through the unit are stable and at appropriate grades, making them suitable for use in the proposed timber harvest. One old skid road located within the streamside filter zone in this unit should not be re-used for this entry as it is not located in compliance with Forest Plan Standards.

Design Criteria

Portions of the area mapped as Junaluska-Brasstown F in the northeastern corner of the stand will be closed to equipment since they fall in the riparian buffer. With respect to the areas mapped as Northcove F and Unicoi Rock Outcrop – equipment will be excluded from areas with slopes in excess of 40% in accordance with project design criteria.

Figure 32. Typical portion of 218/10 with grades of 15%-20% Area mapped as Junaluska-Brasstown “E”.



Figure 33. Typical portion of 218/10 with grades of 15%-20%. Area mapped as Junaluska-Brasstown "E".



Figure 34. Typical portion of 218/10 with grades of 15%-20%. Area mapped as Junaluska-Brasstown "E".



Figure 35. Old skid roads through the unit are stable and generally run at appropriate grades, making them suitable for use in the proposed timber harvest. Area mapped as Junaluska-Brasstown "E".



Figure 36. Old skid roads through the unit are stable and generally run at appropriate grades, making them suitable for use in the proposed timber harvest. Area mapped as Junaluska-Brasstown "E".

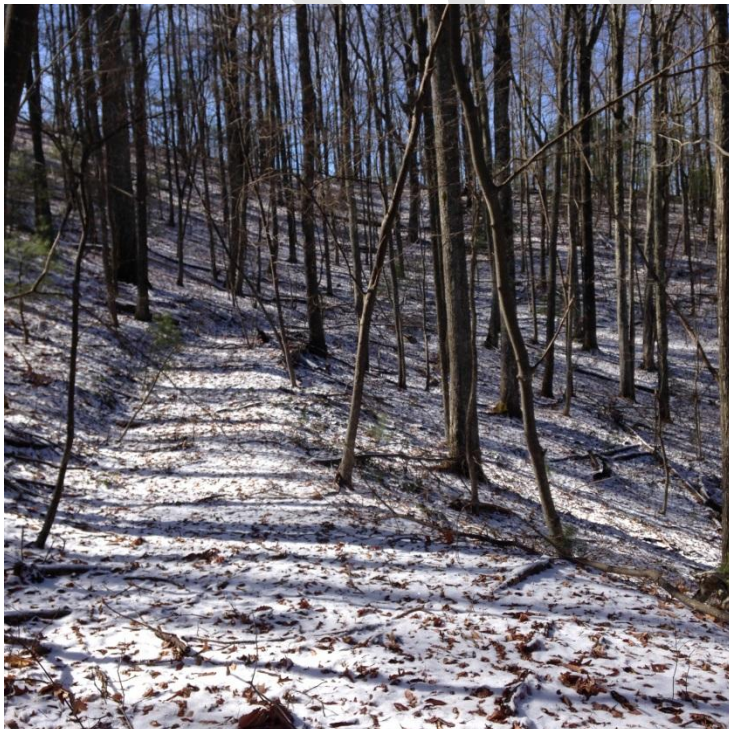


Figure 37. Old skid roads through the unit are stable and generally run at appropriate grades, making them suitable for use in the proposed timber harvest. Area mapped as Junaluska-Brasstown "E".



Figure 38. Old skid roads through the unit are stable and generally run at appropriate grades, making them suitable for use in the proposed timber harvest. Area mapped as Junaluska-Brasstown "E".



Figure 39. Equipment will be excluded from portions of the area mapped as Junaluska-Brasstown "F" that fall within the riparian buffer or streamside filter zone. The old skid road along the stream in this photo would not be re-used for this entry as it is not located in compliance with Forest Plan Standards.



Figure 40. Equipment will be excluded from portions of the area mapped as Junaluska-Brasstown "F" that fall within the riparian buffer or streamside filter zones.



Date: 2/4/15

Participants: Jim Stelick (Silviculturist), Ali Reddington (Hydrologist), Jeff Kincaid (Prescription Forester)

The fifth day of fieldwork focused on visiting the remaining stands in the Ricker Mountain and Devil's Kitchen Areas. The day's fieldwork also included a visit to a timber sale closed in 2005 and located adjacent to Compartment 214 Stand 13. Both the area of the 2005 sale inspected and photographed, and the southern portion of 214/13 are located on soils mapped as Junaluska-Brasstown E/F. Slopes and log landings associated with this sale are stable and fully revegetated. Equipment was limited to locations with appropriate slopes in compliance with forest plan standards and Tennessee BMPs.

Figure 41. Edge of log landing and adjacent slope of 2005 sale on Ricker Mountain. Slope is stable. Area mapped as Junaluska-Brasstown "E".



Figure 42. Log landing from 2005 sale on Ricker Mountain. Landing is stable and fully revegetated. Area mapped as Junaluska-Brasstown "E".



Compartment 214 Stand 13

Observations

The slope of the main ridge running roughly north-south in this stand is approximately 35% at its steepest. The eastern face of the ridge is mapped as Unicoi Rock Outcrop but actually grades from approximately 60% slope at the southern end to approximately 15% towards the northeastern corner. The southwestern and western faces of the ridge are accurately mapped as “F” and “G” slopes.

Design Criteria

The steeper southern portion of the eastern face of the ridge may be traversed by a skid road to access the timber on flatter ground in the northeastern corner of the stand. If greater than 200 ft. long on a sustained side-slope greater than 40%, in compliance with project design criteria, interdisciplinary team approval will be required. Ground based equipment will be prohibited from operating on slopes greater than 40% on the southwestern and western faces of the ridge. Timber in these areas may be directionally felled and cabled up to the ridge or down to the road.

Figure 43. Main ridge running north-south through 214/13. Area mapped as Junaluska-Brasstown “E”.



Figure 44. Looking east across area mapped as Junaluska-Brasstown F in 214/13. The area mapped as Northcove F is just to the right, out of the picture.



Figure 45. Eastern face of main ridge. Area mapped as Unicoi Rock Outcrop. This area may be traversed by a skid road built in compliance with project design criteria.



Figure 46. Western face of main ridge. Area mapped as Unicoi Rock Outcrop. Equipment would be prohibited in this area.



Compartment 214 Stand 15

Observations

The Soco, Northcove, and Unicoi soils in this stand are thin and rocky. Much of it could be described as a boulder-field.

Design Criteria

Recommend changing this stand to non-commercial treatment. This soils in this stand are unsuitable for commercial ground-based timber harvest equipment operations.

Compartment 214 Stands 20 and 26

Observations

These stands are characterized by a main ridge running roughly northwest-southeast (mapped as Soco "F") and a secondary ridge running roughly northeast-southwest (mapped as Soco F). The slope of both ridges as measured in the field is approximately 35%. Slopes in the remainder of the area range from 45% to greater than 60%.

Design Criteria

Ground based equipment operation within these stands will be limited to the two ridges described above. Other areas are too steep for operation of ground based equipment.

Figure 47. Secondary ridge mapped as Soco F.



Figure 48. Terrain along southern edge of 214/26 is too steep for operation of ground-based logging equipment. Area mapped as Soco "F".



Figure 49. Main ridge mapped as Soco E (20-35%)



Compartment 209 Stands 6, 34, 35, and 38

Compartment 264 Stands 8 and 22

Observations

These stands were inspected and described together since they are contiguous and similar in both terrain and soils. These units run roughly northeast-southwest along a narrow ridge between Rough Branch and Devil's Kitchen Branch. The ridgetop is mapped as Junaluska-Brasstown D,E, and F. Portions of the stands extending down the north side of the ridge are mapped as Unicoi Rock Outcrop. In general, the ridgeline is gently sloping (less than 20%) and would be suitable for use of ground-based logging equipment. The side-slopes are much too steep for operation of ground-based equipment.

Design Criteria

Any timber harvested past the slope-break would need to be cabled up to the ridge.

Figure 50. Slope break along northern side of ridge. Area mapped as Junaluska-Brasstown "F".



Figure 51. Panoramic view north into area mapped as Unicoi Rock Outcrop from existing road along gently sloping ridgeline



Figure 52. Steep side-slope along northern face of ridge. Area mapped as Unicoi Rock Outcrop.



Summary/Conclusions

Soil map units in NRCS soil surveys are typically delineated at a mapping scale of 1:20,000 (3.18 inches/mile) or 1:24,000 (2.64 inches/mile). This scale of mapping is larger than the area typically covered by stands, the common unit of management on the Cherokee National Forest. For this reason, soil mapping unit slopes can have a wider range than stands. Thus, it is necessary to judge risks to soil stability and productivity based on site-specific topography rather than on inclusion in a broad slope class or soil map unit.

Over the course of 5 days, all stands proposed for commercial timber harvest using ground-based operations were visited by an interdisciplinary team consisting of a timber management specialist, a soil scientist and/or a hydrologist. These site visits confirmed that generally the timber management specialist planned to minimize the operations of ground-based equipment in areas deemed by the group to be high risk. Only two stands (209/30 and 217/4) were determined to require a subsequent review during the layout phase. It is anticipated, based on past performance and design criteria, that the return visit to those stands will reveal that sale layout is appropriate and that no site-specific mitigation measures are required.